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EXAMINER

BAND, MICHAEL A

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/814,693	Applicant(s) LIPKIN ET AL.	
	Examiner Michael Band	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 9-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9-32 is/are rejected.
- 7) ☐ Claim(s) 11 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 11 and 12 are objected to because of the following informalities: Both claims are dependent upon a canceled claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 11 and 12 are dependent upon canceled claim 7.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6, 9-10, 13-19, and 24-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Jackson et al (US Patent No. 6,287,644).

With respect to claim 1, Jackson et al discloses a method for forming a continuously-graded bonded coat (i.e. protective coat) (abstract), where “the bond coat is disposed on a substrate, for example a turbine component, to prevent its severe environmental attack, and structural weakening” (col. 4, lines 51-54). A source ingot (i.e.

Art Unit: 1795

target) is used for forming the continuously-graded bond coat (abstract). Jackson et al also discloses the source ingot (i.e. target) being comprised of about 5.0 to about 40.0 atomic percent of chromium and about 50.0 to less than 100.0 atomic percent of aluminum (col. 3, lines 22-25). Jackson et al further discloses a variety of manufacturing methods for the bond coat, including Ion Plasma Deposition (col. 6, lines 23-28). In addition Jackson et al further states that the bond coat comprises a mixture of chromium (Cr), aluminum (Al), yttrium (Y), and other metals (col. 3, lines 20-29). Jackson et al also discusses using other materials in the bond coat mixture, such as nickel (Ni). Furthermore, Jackson et al discloses how thermal bond coat systems (TBCS) typically comprise an oxidation resistant alloy, such as MCrAlY (chromium-aluminum-yttrium compound), where M is at least one of iron, cobalt or nickel (col. 1, lines 56-59). Jackson et al then states that alternatively, a bond coat comprising a diffusion aluminide or platinum-aluminide material is used to form an oxidation-resistant intermetallic component (col. 1, lines 59-66).

With respect to claim 2, Jackson et al further discloses that the source ingot comprises various atomic percentage ranges of zirconium, hafnium, silicon, and yttrium (col. 3, lines 22-29).

With respect to claim 3, Jackson et al further discloses a source ingot (i.e. target) being composed of zirconium in a range of about a trace to 0.5 atom percent, yttrium in a range from about a trace to 2.0 atom percent, and hafnium in a range from about 0.5 to about 2.0 atom percent. However Jackson et al does not explicitly disclose carbon being present in the ingot. It would be inherent that trace amounts of carbon be present

Art Unit: 1795

in the target even though Jackson et al does not discuss this characteristic. As evidenced by Rigney et al (US Patent No. 6,153,313), additions of hafnium, zirconium and yttrium serve to scavenge impurity atoms, such as carbon, that cause a decrease in interface cohesion (col. 6, lines 62-64). *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

With respect to claim 6, the reference is cited as discussed for claim 3. Jackson et al further discloses the source ingot (i.e. target) comprising about 5.0 to 40.0 atomic percent chromium, about 0.5 to 2.0 atomic percent hafnium, about 1.0 to 17.0 atomic percent silicon, and about 50.0 to less than 100.0 atomic percent aluminum (i.e. the balance) (abstract).

With respect to claim 9, Jackson et al further discloses how "the substrate [60] can be maintained at a high surface temperature, for example at a temperature in a range from about 950°C to about 1200°C. The high surface temperature permits reaction of the deposited materials (i.e. aluminum and nickel) and the substrate (col. 7, lines 33-40).

With respect to claims 10 and 13-14, Jackson et al further discloses "heat treatments of the continuously-graded bond coat to form a protective coating at the outer surfaces" (col. 8, lines 60-62) of the substrate. Jackson et al further discusses how the "heat treatments are provided for about 4 hours at a temperature range of about 1000°C to about 1200°C" (col. 9, lines 1-3).

With respect to claims 15 and 16, Jackson et al further discloses that "the aluminum in the first-deposited region reacts with the material of the superalloy

Art Unit: 1795

substrate, such as, but not limited to, nickel" (col. 7, lines 30-32). Jackson et al also discusses "exemplary high-temperature resistant materials [including], but not limited to, nickel-based superalloy materials, iron-based superalloy materials, nickel-iron-based superalloy materials, and cobalt-based superalloy materials (col. 4, lines 29-33). "The following description [*Detailed Description of the Invention*] refers to a nickel-based superalloy material for the substrate material" (col. 4, lines 33-35).

With respect to claim 17, Jackson et al further discloses that " the invention is related to a continuously-graded aluminide-based bond coat on articles exposed to high temperatures, such as components of turbines and engines" (col. 1, lines 13-16), and in greater detail, "hot-section gas path surfaces in modern jet engines and gas turbines, including buckets, rotors, turbine tips, nozzles, blades, vanes, and airfoils, and their components (hereinafter "turbine components") [that] are exposed to oxidizing gases at high temperatures" (col. 4, lines 22-26). Jackson et al also states that these components are formed from high-temperature resistant materials, including nickel-based superalloy materials, iron-based superalloy materials, nickel-iron-based superalloy materials, and cobalt-based superalloy materials (col. 4, lines 28-33).

With respect to claim 18, Jackson et al further discloses "after deposition if the high vapor-pressure materials, subsequent deposits (i.e. coatings) comprise intermediate vapor-pressure materials in regions 62, 63, 64, 65....,62_n" (col. 7, lines 66-67; col.8, line 1; fig. 3).

With respect to claim 19, Jackson et al further discloses an ingot (i.e. target) composed of various compositions of metals, with the majority of the metal being

Art Unit: 1795

composed of aluminum (abstract). However Jackson et al is limited in that it does not state how the ingot is produced. It is well known that aluminum is not naturally found as a pure metal. In order to obtain pure aluminum from bauxite, the bauxite must be added to a specified chemical mixture (i.e. Bayer process) to form alumina, and then electrolyzed to precipitate the alumina out of solution as aluminum powder (i.e. Hall-Heroult process) (i.e. powder metallurgy). It is also well known that ingots, as required in Jackson et al (i.e. aluminum ingots), are commonly formed via casting process. Therefore it is implicit that the ingots of Jackson et al are made via a powder and casting metallurgy processing as discussed.

With respect to claims 24-26, Jackson et al further discloses that “the continuously-graded bond coat (i.e. protective coating) [105] is typically deposited on a substrate [60] in an amount less than a total desired TBCS (Thermal Barrier Coating System) [100] thickness. The TBC (Thermal Barrier Coating) [101] is then deposited on the continuously-graded bond coat, so the TBC and the continuously-graded bond coat equal the total desired TBCS thickness. For example, if a TBCS with about a 200 micron (i.e. 200 micrometer) total thickness is desired, a continuously-graded bond coat having a thickness in a range from about 50 microns to about 70 microns is first deposited” (col. 9, lines 17-26; fig. 4).

With respect to claim 27, Jackson et al further discloses that a TBC typically comprises a layer that includes zirconia in the form of partially- or fully-stabilized by yttria (col. 1, lines 38-40 and 42-44).

Art Unit: 1795

With respect to claims 28-30, Jackson et al further discloses that a source ingot (i.e. target) of 99.5Al-0.5Zr will yield an average composition of the continuously-graded bond coat (i.e. protective coat) of 99.75% NiAl (i.e. a single phase) and 0.25% Zr (i.e. NiAl % + Zr % is a double phase) when reacted with the substrate (col. 9, lines 57-62), thus larger than 80% and being a B2-structured aluminide intermetallic (i.e. nickel-aluminum).

With respect to claim 31, Jackson et al further discloses a bond coat (i.e. protective coat) comprising "an oxidation-resistant alloy, such as MCrAlY, where M is at least one of iron, cobalt and nickel" (col. 1, lines 57-59) (i.e. B2-structured aluminide intermetallic phase). Jackson et al also discusses that the bond coat can comprise a platinum-aluminide material that form an intermetallic component (col. 1, lines 61-60), and that the bond coats can mechanically interlock the substrate to the TBC (col. 1, lines 61-63).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

Art Unit: 1795

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson et al (US Patent No. 6,287,644) as applied to claim 3.

With respect to claims 4, the reference is cited as discussed for claim 3. Jackson et al further discloses the source ingot (i.e. target) comprising about 5.0 to 40.0 atomic percent chromium, about trace to 0.5 atomic percent zirconium, and about 50.0 to less than 100.0 atomic percent aluminum (i.e. the balance) (abstract).

However Jackson et al is limited in that while it does disclose a range for atomic percent zirconium, the range does not encompass the claimed about 1 atom percent. However it would have been obvious to one of ordinary skill to use 1 atomic percent zirconium for the target since it has been held that a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson et al (US Patent No. 6,287,644) as applied to claim 3, and further in view of Rigney et al (US Patent No. 6,153,313).

With respect to claim 5, the reference is cited as discussed for claim 3. Jackson et al further discloses the source ingot (i.e. target) comprising about 5.0 to 40.0 atomic

Art Unit: 1795

percent chromium, about a trace to 0.5 atomic percent zirconium, and about 50.0 to less than 100.0 atomic percent aluminum (i.e. the balance). However Jackson et al is limited in that it does not discuss using an atom percent of tantalum in the target or alloy.

Jackson et al is also limited in that while it does disclose a range for atomic percent zirconium, the range does not encompass the claimed about 1 atom percent.

However it would have been obvious to one of ordinary skill to use 1 atomic percent zirconium for the target since it has been held that a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Rigney et al teaches a coating system for articles used in hostile thermal environments, such as turbine, combustor and augmentor components of a gas turbine engine (abstract). Rigney et al further teaches that the coating contains a predominant portion of NiAl to promote oxidation resistance, with the coating including additions of chromium, zirconium, and tantalum (abstract). Rigney et al also teaches that the bond coating is formed via physical vapor deposition (i.e. ion plasma deposition) (col. 5, lines 21-22), and therefore it is inherent that a target is used to apply the bond coating. Table I depicts a preferred bond coating percentage of 0.5-15% chromium, 0.01-0.5% zirconium, 0.1-3.0% tantalum, and a significant portion of the remaining percentage of aluminum (Table I, col. 7). All percentages of the bond coating are in atom percents (col. 6, lines 65-67). Rigney et al lists the desirable advantages of this compositional

Art Unit: 1795

bond coating as an increase in creep strength and abilities to getter impurities, increase fracture resistance, and promote oxidation resistance (abstract). Although Rigney et al discusses the atom percents being of the alloy compositions instead of target compositions, it is inherent that a target would be present in a physical vapor deposition apparatus and thus obvious to construct the target of a similar material composition as of the desired bond coating.

It would have been obvious to one of ordinary skill in the art to include 0.1-3.0% tantalum taught in Rigney et al in the target composition of Jackson et al in order to gain the advantages of gettering impurities, increasing fracture resistance, and promotion of oxidation resistance.

10. Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson et al (US Patent No. 6,287,644) as applied to claim 1 above, and further in view of Chiang et al (USPGPub 2002/0070375).

With respect to claims 20-23, Jackson et al further discloses that a power supply heats the materials to cause the bond coat to form onto the substrate (col. 13, lines 29-41). Jackson et al discusses that power values between the range of 0.5kW and 2.5kW were used (col. 13, lines 30-41). However Jackson is limited in that while power is being used and therefore a voltage, it does not teach the claimed voltage range of the power source.

Chiang et al teaches a sputtering method of Ion Metal Plasma (i.e. ion plasma) deposition for applying tantalum films (i.e. tantalum coats) by altering the substrate DC offset bias voltage (abstract). Chiang et al further discusses how the DC power was

Art Unit: 1795

adjusted over a range from about 1 kW to about 8 kW, with the range being preferable from about 1kW to about 3kW (p. 4, para 42). Fig. 2B displays how as the DC power increases from about 1 kW to about 3 kW, the pressure also increases. Chiang et al discusses how as the process pressure increases, an increase in ion bombardment of the depositing film surface is seen (p. 4, para 45). Chiang et al further discusses how an increase in ion bombardment of depositing film surface can also be achieved by increasing the DC offset bias voltage of the substrate (p. 4, para 46). The power bias range for this can be seen in figure 3, with the corresponding substrate DC offset bias voltage ranging from about 0 volts to about -150 volts (p. 4, para 46). It is inherent that the substrate is grounded since an electrical potential is running through the substrate as the DC voltage is applied.

Jackson et al discloses that a power source, and thus a voltage, is applied but does not specify a particular voltage value. Chiang et al teaches a voltage between 0 volts and -150 volts for a similar ion plasma deposition method. It would have been obvious to one of ordinary skill in the art to incorporate the voltage range of Chiang et al into the power source of Jackson et al since Jackson et al fails to disclose a specific voltage associated with the power source and one of ordinary skill in the art would have a reasonable expectation of success in making the modification.

11. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson et al (US Patent No. 6,287,644) in view of Chiang et al (USPGPub 2002/0070375).

With respect to claim 32, Jackson et al further discloses that "the aluminum in the first-deposited region reacts with the material of the superalloy substrate, such as, but

Art Unit: 1795

not limited to, nickel" (col. 7, lines 30-32). Jackson et al also discusses "exemplary high-temperature resistant materials [including], but not limited to, nickel-based superalloy materials, iron-based superalloy materials, nickel-iron-based superalloy materials, and cobalt-based superalloy materials (col. 4, lines 29-33). "The following description [*Detailed Description of the Invention*] refers to a nickel-based superalloy material for the substrate material" (col. 4, lines 33-35). Jackson et al further discusses a method for forming a continuously-graded bonded coat (i.e. protective coat) (abstract), where "the bond coat is disposed on a substrate, for example a turbine component, to prevent its severe environmental attack, and structural weakening" (col. 4, lines 51-54). A source ingot (i.e. target) is used for forming the continuously-graded bond coat (abstract). Jackson et al also discloses the source ingot being comprised of about 5.0 to about 40.0 atomic percent of chromium and about 50.0 to less than 100.0 atomic percent of aluminum (col. 3, lines 22-25). Jackson et al also states a variety of manufacturing methods for the bond coat, including Ion Plasma Deposition (col. 6, lines 23-28). Jackson et al further teaches the source ingot (i.e. target) being composed of zirconium in a range of about a trace to 0.5 atom percent, yttrium in a range from about a trace to 2.0 atom percent, and hafnium in a range from about 0.5 to about 2.0 atom percent. However Jackson et al does not disclose carbon being present in the ingot. It would be inherent that trace amounts of carbon be present in the target even though Jackson et al does not discuss this characteristic. As evidenced by Rigney et al, additions of hafnium, zirconium and yttrium serve to scavenge impurity atoms, such as carbon, that cause a decrease in interface cohesion (col. 6, lines 62-64). *Continental Can Co. USA*

Art Unit: 1795

v. Monsanto Co., 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

Jackson et al further discloses two melt pools, one of aluminum and the other of nickel (col. 7, lines 37-39; figure 3, part 85). These two metal are deposited onto the substrate (fig. 3, [60]). Jackson et al further discusses how cobalt can also be incorporated into this layer [85] (col. 7, lines 40-44) Fig. 3 also depicts "regions 62, 63, 64, 65 and 62_n, where n equals the number of possible regions that are compositionally distinguished in the continuously-graded bond coat" (col. 8, lines 1-3). The aluminum-nickel region (i.e. metal layer, B2-structured aluminide intermetallic) [85] is deposited prior to the protective coating [62]-[62_n] as displayed in fig. 3. Jackson et al also discloses how "the substrate [60] can be maintained at a high surface temperature, for example at a temperature in a range from about 950°C to about 1200°C. The high surface temperature permits reaction of the deposited materials (i.e. aluminum and nickel) and the substrate (col. 7, lines 33-40). In addition Jackson et al further states that the bond coat comprises a mixture of chromium (Cr), aluminum (Al), yttrium (Y), and other metals (col. 3, lines 20-29). Jackson et al also discusses using other materials in the bond coat mixture, such as nickel (Ni). Furthermore, Jackson et al discloses how thermal bond coat systems (TBCS) typically comprise an oxidation resistant alloy, such as MCrAlY (chromium-aluminum-yttrium compound), where M is at least one of iron, cobalt or nickel (col. 1, lines 56-59). Jackson et al then states that alternatively, a bond coat comprising a diffusion aluminide or platinum-aluminide material is used to form an oxidation-resistant intermetallic component (col. 1, lines 59-66). However Jackson et al

Art Unit: 1795

is limited in that while a power is applied to the process, it does not specifically state if the substrate is biased via negative potential during the deposition.

Chiang et al teaches a sputtering method of Ion Metal Plasma (i.e. ion plasma) deposition for applying tantalum films (i.e. tantalum coats) by altering the substrate DC offset bias voltage (abstract). Chiang et al further discusses how the DC power was adjusted over a range from about 1 kW to about 8 kW, with the range being preferable from about 1kW to about 3kW (p. 4, para 42). Chiang et al further teaches that the power bias range for this can be seen in figure 3, with the corresponding substrate DC offset bias voltage ranging from about 0 volts to about -150 volts (p. 4, para 46). Chiang et al describes the advantage of applying a bias is to increase the ion bombardment of the film surface, thereby decreasing the amount of time necessary to apply the film (i.e. coat) (p. 4, para 45)

It would have been obvious to one of ordinary skill in the art to incorporate applying a negative potential bias to the substrate taught in Chiang et al to the method of Jackson et al in order to gain the advantage of decreased film application time.

Response to Arguments

Claim Objections

12. Applicant has amended claim 3 to correct minor informalities. The objection is withdrawn.

102 Rejections

Art Unit: 1795

13. Applicant's arguments with respect to claims 1-3, 6, 9-10, 13-19, and 24-31 have been considered but are moot in view of the new ground(s) of rejection as necessitated by amendment.

14. Applicant argues on pages 8 and 9 that an aluminum-nickel region deposited in a "first deposited region" does not suggest that said region can or should contain platinum or palladium.

The Examiner respectfully disagrees. In fig. 4 a substrate [60] with a bond coat [105], where the bond coat is formed from a source ingot which is composed of a majority of aluminum and chromium (abstract; col. 3, lines 22-25). Furthermore "Jackson et al further states that the bond coat comprises a mixture of chromium (Cr), aluminum (Al), yttrium (Y), and other metals. Jackson et al also discusses using other materials in the bond coat mixture, such as nickel (Ni). Furthermore, Jackson et al discloses how thermal bond coat systems (TBCS) typically comprise an oxidation resistant alloy, such as MCrAlY (chromium-aluminum-yttrium compound), where M is at least one of iron, cobalt or nickel. Jackson et al then states that alternatively, a bond coat comprising a diffusion aluminide or platinum-aluminide material is used to form an oxidation-resistant intermetallic component (see rejection of claim 1)".

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

Art Unit: 1795

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MAB



ALEXA D. NECKEL
SUPERVISORY PATENT EXAMINER